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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,951	07/28/2003	Todd Williamson	ZAXE0004	6165
22862	7590	07/28/2005	EXAMINER	
GLENN PATENT GROUP 3475 EDISON WAY, SUITE L MENLO PARK, CA 94025			PAPPAS, PETER	
			ART UNIT	PAPER NUMBER
			2671	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<p>Application No.</p> <p align="center">10/628,951</p>	<p>Applicant(s)</p> <p align="center">WILLIAMSON ET AL.</p>	
	<p>Examiner</p> <p align="center">Peter-Anthony Pappas</p>	<p>Art Unit</p> <p align="center">2671</p>	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 May 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-15, 17-25, 27-33, 35 and 36 is/are rejected.
- 7) ☒ Claim(s) 6, 16, 26 and 34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Allowable Subject Matter***

1. Claims 6, 16, 26 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
2. In regards to claims 6, 16, 26 and 34 the prior art of record fails to teach or suggest wherein said calculating user position step detects the effects of viewing angles and gives higher weight to target markers that are detected at more reliable angles.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claims 1-2, 7-12, 17-22, 27-30 and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sauer et al. (U.S. Pub. No. 2002/0075201) in view of Rekimoto et al. (CyberCode: Designing Augmented Reality Environments with Visual Tags).
5. In regards to claim 1 Sauer et al. teaches a movable head-mounted display (HMD) system worn by a user, wherein said HMD includes an imaging camera, tracking camera (video camera) and display (video display). Sauer et al. both teaches and illustrates providing and distributing a plurality of target markers within a workshop area (p.1, ¶ 12-13; p. 3, ¶ 35, lines 10-12; p. 3, ¶ 43; Fig. 4). Said workshop area is considered to read on the limitation "room."

Sauer et al. fails to explicitly teach wherein each of said plurality of target markers are distinct from all other target markers in said plurality of target markers and distinct from rotated versions of itself. Rekimoto et al. teaches a 2D-barcode system designed to be used in several augmented reality system (p. 2, column 1, ¶ 2), which utilizes a plurality of markers (printed tags) which are distinct from all other target markers in said plurality of target markers and distinct from rotated versions of itself (Fig. 4).

It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate printed tags taught by Rekimoto et al. into the system taught by Sauer et al., because utilizing said printed tags would provide a less expensive and more versatile tagging technology, which could be easily created and attached to almost any physical object (p. 1, column 2, ¶ 2), thus allowing for a wide application of said tags.

Sauer et al. teaches that said tracking camera captures a field of view (video signal of a portion of said room) including a marker structure. The markers structure includes a plurality of light emitting diodes, visible to the tracking camera which locates said markers (p. 1, ¶ 13, lines 3-5; p. 1, ¶ 14; p. 3, ¶ 35, lines 10-17; Fig. 1). Sauer et al. teaches calculating user position within said room using relative position of identified target markers (p. 3, ¶ 35, lines 10-17; p. 3, ¶ 40, lines 4-7). It is noted the determination of the position and orientation (i.e. viewing angle) of said imaging cameras, through the use of said tracking camera, is considered to result in the position of said user which is wearing said HMD which comprises said imaging camera.

Sauer et al. teaches streaming 3D video content to the user through said video display (p. 4, ¶ 47, lines 19-25, p. 4, ¶ 51; Fig. 1). It is noted that as the relationship between the tracking and imaging cameras assist in generating said video content that any adjusted position or viewing angle information set for said cameras are considered to be incorporate into said video content.

6. In regards to claim 2 Sauer et al. teaches a target calibration means for automatically calibrating relative positions of said plurality of target markers within said room (p. 3, ¶ 43).

7. In regards to claim 7 Sauer et al. and Rekimoto et al. fail to explicitly teach wherein said receiving step receives said video signal via a wireless link. Official Notice is taken that both the concept and the advantages of transferring and receiving video signals via a wireless link is well known and expected in the art. It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate the utilization of wireless technology for the transfer and receiving of video information into the system taught by Sauer et al. and Rekimoto et al., because through such incorporation it would allow the user of said HMD more freedom of movement as they would be less restricted then they would be if tethered to another object by physical wires.

8. In regards to claim 8 Sauer et al. and Rekimoto et al. fail to explicitly teach wherein said streaming step streams said 3D video content to the user through said video display via a wireless link. Official Notice is taken that both the concept and the advantages of transferring and receiving video signals via a wireless link is well known

and expected in the art. It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate the utilization of wireless technology for the transfer and receiving of video information into the system taught by Sauer et al. and Rekimoto et al., because through such incorporation it would allow the user of said HMD more freedom of movement as they would be less restricted than they would be if tethered to another object by physical wires.

9. In regards to claim 9 Sauer et al. teach that the virtual view is rendered according to the camera pose information, determined by the processor, and blended (overlaid) with the corresponding video images. The augmented images can then be displayed stereoscopically (p. 4, ¶ 43, lines 5-9; Fig. 1).

10. In regards to claim 10 it is noted said system is considered to include a sufficient number of target markers (Fig. 4) such that at least one target marker is always visible in said video signal.

11. In regards to claim 11 the rationale disclosed in the rejection of claim 1 is incorporated herein. Sauer et al. further teaches a module 116 for receiving a video signal, a module 112 for identifying at least one target marker in said video signal, a module 118 for calculating user position within said room using relative positioning of identified target markers, a module 122 for streaming 3D video content to the user through said video display 124 and a module 118 for dynamically repositioning the user's perspective viewpoint within said 3D content (Fig. 1). It is noted said system is considered to perform the process.

12. In regards to claim 12 the rationale disclosed in the rejection of claim 2 is incorporated herein.

13. In regards to claim 17 the rationale disclosed in the rejection of claim 7 is incorporated herein.

14. In regards to claim 18 the rationale disclosed in the rejection of claim 8 is incorporated herein.

15. In regards to claim 19 the rationale disclosed in the rejection of claim 9 is incorporated herein.

16. In regards to claim 20 the rationale disclosed in the rejection of claim 10 is incorporated herein.

17. In regards to claim 21 the rationale disclosed in the rejection of claim 1 is incorporated herein. It is noted that said system is considered to perform the process.

18. In regards to claim 22 the rationale disclosed in the rejection of claim 2 is incorporated herein.

19. In regards to claim 27 the rationale disclosed in the rejection of claim 7 is incorporated herein.

20. In regards to claim 28 the rationale disclosed in the rejection of claim 8 is incorporated herein.

21. In regards to claim 29 the rationale disclosed in the rejection of claim 11 is incorporated herein.

22. In regards to claim 35 the rationale disclosed in the rejection of claim 17 is incorporated herein.

23. In regards to claim 36 the rationale disclosed in the rejection of claim 20 is incorporated herein.

24. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

25. Claims 3-5, 13-15, 23-25 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sauer et al. (U.S. Pub. No. 2002/0075201) and Rekimoto et al. (CyberCode: Designing Augmented Reality Environments with Visual Tags), as applied to claims 1-2, 7-12, 17-22, 27-30 and 35-36, in view of Brady et al. (U.S. Patent No. 5, 473, 931).

26. In regards to claim 3 Sauer et al. and Rekimoto et al. fail to explicitly teach identifying pairs of target markers. Brady et al. teaches identifying pairs of target markers 22 (Figs. 2, 5). It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate the teachings of Brady et al. into the system taught by Sauer et al., because Sauer et al. teaches that calibration amongst a plurality of markers for the calibration of said cameras is needed for the registration between real objects and virtual objects, but Sauer et al. does not elaborate on the details of said calibration. Brady et al. provides said detail into the means of said calibration, wherein said calibration allows for the translation of information from one coordinate system (i.e. to another coordinate system (Brady et al., column 3, lines 41-46), thus allowing for said information to be retrieval and utilized accordingly.

27. In regards to claim 4 Sauer et al. teaches performing calibration in which the geometric relationship between marks are known (p. 3, ¶ 43, lines 5-8). Sauer et al. and Rekimoto et al. fail to explicitly teach determining the position of each target in a target pair relative to said video camera, calculating positioning of each target in a target pair relative to each other and storing the relative positioning of the target pair in a list of relative target transforms. Brady et al. teaches determining the position of said markers from a video camera (column 3, line 48), calculating positioning of each target in a target pair relative to each other (column 3, lines 51-54) and storing the relative positioning of the target pair in a list (lookup table) of relative target transforms (column 8, lines 40-50). The motivation disclosed in the rejection of claim 3 is incorporated herein.

28. In regards to claim 5 Sauer et al. and Rekimoto et al. fail to explicitly teach determining the relative position of identified target markers using said relative target transforms. Brady et al. teaches utilizing said lookup table for the purposes of marker information retrieval (column 8, lines 40-50). The motivation disclosed in the rejection of claim 3 is incorporated herein.

29. In regards to claim 13 the rationale disclosed in the rejection of claim 3 is incorporated herein.

30. In regards to claim 14 the rationale disclosed in the rejection of claim 4 is incorporated herein.

31. In regards to claim 15 the rationale disclosed in the rejection of claim 5 is incorporated herein.

32. In regards to claim 23 the rationale disclosed in the rejection of claim 3 is incorporated herein.

33. In regards to claim 24 the rationale disclosed in the rejection of claim 4 is incorporated herein.

34. In regards to claim 25 the rationale disclosed in the rejection of claim 5 is incorporated herein.

35. In regards to claim 31 the rationale disclosed in the rejection of claim 13 is incorporated herein.

36. In regards to claim 32 the rationale disclosed in the rejection of claim 14 is incorporated herein.

37. In regards to claim 33 the rationale disclosed in the rejection of claim 15 is incorporated herein.

### ***Conclusion***

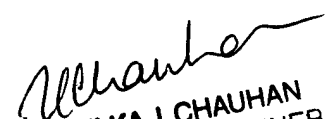
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter-Anthony Pappas whose telephone number is 571-272-7646. The examiner can normally be reached on M-F 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2671

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PAP

  
ULKA J. CHAUHAN  
PRIMARY EXAMINER